IPv6: Fly to Future

Challenge, Opportune and …

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China Internet Market and CNGI
China Internet Market Overview

IPv4 Addresses: 181,273,344, rise 34.0% than 2007

Backbone: 2.5-10G

IPv6 Addresses: 57 /32, BII Group 16 /32

Exchange Points: over 100G (Beijing, Shanghai, Shenzhen)

International Links: 640,286.67 Mbps, rise 73.6% than 2007

Domain name: 16,826,198, rise 41% than 2007
China Mobile Internet Market Overview (1)

• Mobile Phone User: 641.23 million, nearly 29.97% of the total are using mobile internet service (Source: MIIT)
• Three big carriers reorganization: ChinaTelecom, ChinaMobile, ChinaUnicom
• 3G licenses were released in January 2009 and China carriers deploy their 3G/BWA Services

Mobile Internet user increase to nearly one time during 2008. Potential user: 200 million, 2.5 times against 2008

Mobile Internet Increment market increase soon. With the development of 3G application, more in the future

New Mobile Internet application, such as: 3G application need high quality of Internet services

Convergence Mobility Internet

Telecom companys face:
• More mobile internet users;
• More attractive applications;
• More high quality services;
China Mobile Internet Market Overview (2)

- Mobile TV (CMMB—China Mobile Multimedia Broadcasting)
  a) 2.5G/700Mhz frequency band utilization;
  b) Wireless mobility broadband access, cover 200 city;
  c) Overall 3D networking IP basic;
China Mobile Internet Market Overview (3)

- Wireless City National Distributing
Why China need IPv6

• **Industry Upgrade & Huge Demand**
  – Last year, China estimate that IPv4 address need around 150million addresses, the actual consumption is 181.273million
  – NGI will connect all of electronic devices not only computers, but for cell phone, PDA, sensors etc.
  – IPv6 is a key basic to Mobile Internet services and 3G data applications require IPv6

• **IPv6 Advantage**
  – Enhanced mobility, security and QoS, Mandatory IPsec support all fully IPv6 compliant devices
  – Trust network: real IP address network architecture
  – Route aggregation reduces the size of routing tables
  – Simplified header reduces router processing loads

• **China National Strategy**
  – Promote next generation network ecosystem
  – Encourage international collaboration
How China Promote IPv6---CNGI

2003—2008
• CNGI demonstration project
• Key technologies
2008—2010
• IPv6 backbone upgrade, access and applications
• Commercial application and service

- A biggest IPv6 Infrastructure project in worldwide. Over 40 cities, national wide, >2.5G backbone
- A joined project initiated by 8 Ministries:
  - NDRC (National Development and Reform Commission)
  - MOST (Ministry of Science and Technology)
  - MII (Ministry of Information Industry)
  - SCIO (The State Council Informatization Office)
  - MOE (Ministry of Education)
  - CAS (China Academy of Science)
  - CAE (Chinese Academy of Engineering)
  - NNSFC (National Natural Science Foundation of China)
- Initial Budget 1.4billion RMB (-2005)

2007年10月8日胡锦涛主席重要批示：确实需从战略高度重视下一代互联网发展。
**CNGI Model**

- **Industry development relationship between CNGI and other scientific programs**
  - Synchronize China IPv6 eco-system with international progress
  - Demonstration network (300 CPNs)
    - 6 core networks, China Telecom, China Netcom/CAS, China Mobile, China Unicom, CERNET, China Railcom
  - Research and development
    - Key technology, Middleware, Applications
  - Mass production
    - Equipment and Applications
  - New ecosystem for Industry – Academic – Research
CNGI - 6IX

EU GEANT2

Asia Pacific TEIN2

CERNET2 China
Telecom
Unicom
Netcom
Mobile
Raicom

1G/2.5/10Gbps
CNGI Achievement(1)---CN2

- CN2 is China Telecom next generation multi-service convergence Carrying Network
- CN2 is the world biggest, most complicated single-domain backbone internet
- Cover 31 provinces and major 200 cities, 300 computer centers, 7 countries and 9 overseas cities
- 865 routers, over 1400 trunk circuits
- Backbone total exchange capacity 152T, edge service network capacity 64T +

High quality service

Wireless access to IPTV/VOD

BWA

3G

Campus wireless coverage
CNGI Achievement(2)---CMNET

China Mobile CNGI Network:

• Entire NGN Architecture
• IPv6 & Mobile communication converge
• IPv6/IPv4 dual stack & multi transition network
• Wireless & wire
• IPv6 Core network, QoS
CNGI Achievement(3)---CERNET2

- Biggest IPv6 production network
- Pure IPv6 for Backbone Network
- Dual stack campus network
- Over 100 universities
- 2009, 826.09 millions for CERNET2 network upgrade;
- Multi-vender Core Routers
- Authentic IPv6 Addressing Architecture
  - SAVA/SAVI: Source Address Validation Architecture
  - An working group setup in IETF70
- IPv4 / IPv6 transition
  - Softwire: an IETF working group setup in IETF69, RFC4925
- Application trials
  - 6PlantLab
  - SIP over IPv6
  - IPv6 IPTV Applications
  - IPv6 based P2P Model Applications
  - IPv6 Multicast trials
CNGI 2

- **Fundamental**: Largest IPv6 infrastructure project. Over 40 cities, National wide, >2.5G backbone.
- **Key technologies and human resource**: SAVA/SAVI, Softwire, IVI etc.
- **2008 CNGI Project Middle Review**;

**CNGI Roadmap**

- **Backbone**: carriers’ NGI deployment
- **Key Technique**: IPv6 backbone
- **Human Resource**
- **CPN**: carriers’ NGI deployment
- **Olympics Demonstration Project**
- **Human Resource**
- **CPN & Application**
- **Customers**: at least 500,000 at the end of 2010;
- **Applications**: Top Website support IPv6 DNS, Voice, Video etc.
- **Aim**: An innovation system of China

- CNGI must be listed as national strategy;
- CNGI is the largest pure IPv6 network in the world;
- International cooperation is the key point of CNGI deployment;
- Build a innovation system for China NGI ecosystem;

**National Development and Reform Commission (NDRC) People’s Republic of China, Zhang Xiaoqiang**
China Engines Again Next-Gen Internet

- August 22, 2008, China central government released the official notice of “Next-Gen Internet Service Trial Commercialization and Equipment Industrialization Projects”

**Network Upgrade and Trail Commercial**
- Upgrade CNGI Backbone and CPN
- IPv6 upgrade in campus network
- IPv6-enabled broadband network trial commercial use
- Develop at least 500,000 IPv6 trial commercial users before the end of 2010
- Top 100 websites must support IPv6 and IPv6 DNS

**Key Technology and Equipment Industrialization**
- Mobile Communication IPv6 access gate
- IPv6 broadband multimedia access gate
- IPv6 wireless surveillance control system

**Standardization**
- CNGI projects specifications
- Test specification for Next-Gen Internet key equipments
振兴计划---Next-Gen Internet Trail Commercial

2009年2月18日温家宝总理指示：要落实拉动内需，拓展电子信息产品应用。要加大在下一代互联网应用，软件等6个方面的投入。

Next-Gen Internet Trail Commercial initiated with IPv6 P2P Business Mode

a) Issues:
   - New internet users dual-stack;
   - City backbone dual-stack and IPv6 data forwarding;
   - DNS IPv6 supported and IDC IPv6 supported;
   - Top 100 websites dual-stack;

b) Mode: 以点代面。Use the experience of advanced cities (eg: Beijing, Shanghai) to promote the work in the entire China

c) Application: 以中国特色为突破口。Breach on Chinese characteristics services.

Mobile Internet  Green Tech  IM  ...
IPv6 Application in 2008 Beijing Olympics
Olympic Access Service

- Olympic Park
- Western Communities
- University Area
- Sightseeing Area

CNC IPv4/IPv6 CNGI Network

Beijing  Qingdao  Shenyang  Shanghai
Olympic Surveillance - Remote Video Network

- The world first IPv4/IPv6 Surveillance and Sensor System
- Innovative architecture: Single system support 5000-20,000 users, large scale distributed deployment
- Support IPv6, seamless transit to next generation network
- Plug and play, easy and efficient operation
The world first IPv4/IPv6 Surveillance and Sensor System

Technical provider of 2008 Olympics IPv4/IPv6 based large scale remote surveillance management system.

Deployed in over 50 Olympics stadiums in China!

国家体育场
国家游泳中心
国家体育馆
北京射箭馆
北京奥林匹克篮球馆
老山自行车馆
顺义奥林匹克水上公园
中国农业大学体育馆
北京大学体育馆
北京科技大学体育馆
北京工业大学体育馆
北京奥林匹克公园网球场
北京奥林匹克公园射箭场
北京五棵松体育中心棒球场
朝阳公园沙滩排球场
老山小轮车赛场
铁人三项赛场
公路自行车赛场

奥体中心体育场
奥体中心体育馆
北京工人体育场
北京工人体育馆
首都体育馆
丰台体育中心垒球场
英东游泳馆
老山山地自行车场
北京射击场飞碟靶场
北京理工大学体育馆
北京航空航天大学体育馆
国家会议中心击剑馆
北京奥林匹克公园曲棍球场
青岛奥林匹克帆船中心
香港奥运马术比赛场
天津奥林匹克中心体育场
上海体育场
沈阳奥林匹克体育中心
秦皇岛市奥体中心体育场
Olympic Surveillance - Demo
Olympic ITS IPv6 Surveillance Management

IPv6 & ITS

- IP based multicast communications convergence
- Enhanced Security
- Mobile IP seamless connectivity
- Plug and Play
- Plenty IP addresses
- End-to-End Communications
- Large information collection
Olympic IPv6 Lighting System

Lighting System - Main Stadium District Control by IPv6 Facility Manage & Control

Lightening Management & Control
- Using IPv6 based Facility Networking
- Area Management System, i.e., not single facility but multiple facilities
- 1.4km x 2.4km with 18,000 lights
- 1,000 IPv6-based control nodes
- 10% Energy saving
Olympics Official IPv6 Website

- You can visit the IPv6 version of the official website of the Beijing 2008 Olympic Games!
  
  ipv6.beijing2008.cn

- The world first IPv6 based website for Olympics, it was provided by CERNET and Sohu.
BII Group in Olympics

• BII Group was awarded as “Pioneer in Technology-empowered Olympics” by Beijing 2008 Olympics Committee.

• As China Government promised Beijing 2008 Olympics achieved three important targets:
  - Technology-empowered Olympics
  - Environment-friendly Olympics
  - Culture-enriched Olympics

• BII Group is the IPv6 technology provider in Olympics and our IPv4/IPv6 surveillance system was widely deployed in it;
IPv6 Ready Logo Activities
IPv6 Ready Logo

- The number of approved Golden IPv6 Ready Logo products around the world is over 274 growing very fast in the last year.
- The silver Logo approved products remain on a steady increase and has reached a total of 382 products from vendors worldwide.
- With the development of IPv6 deployment and next generation internet, more and more equipments or vendors need IPv6 Ready Logo.

Fig. 1. Total number of Golden IPv6 Ready Logo approved products
IPv6 Ready in China

• US. and China are the two fastest growth in the world in 2008;
• BII Group the unique authorization labs by IPv6 Ready Logo Committee;
• Promote China’s vendors’ overseas marketing expanding and enhance collaboration technology innovation; cooperate with IETF, Global IPv6 Forum, SIP Forum to make more contribution for NGN in world wide;
• Make services for more than 30 international companies, such as: Microsoft, Cisco etc. Be participated in International standard deployment;
BII Group
BII Group Introduction

• Position
  – Pioneer and promoter of Chinese telecom and IT industry

• History
  – BII Group originated from BII (Beijing Internet Institute) in 1995. BII is the first private research and industrialization institute focusing on IT and Telecom in China.

• Business Field
  – TMT Consulting
  – Event Organization
  – Green IT Technology
  – Internet Protocol Testing and Certification
  – NGI Technology/Application R&D and Product
  – Network Design / SI
BII Group R&D Domain

BII Group R&D domain covering four different branches:

a) IP technology test---IPv6 global test center, auto-test software etc.;
b) Surveillance management system---both support v4/v6;
c) Green Community Technology-ubiquitous green community control net;
d) TMT Integration;

- Government
  - MIIT
  - NDIC
  - MOST
  - Z-Park

- University
  - Tsinghua
  - BUPT
  - BJTU

- Organization
  - Lenovo
  - Huawei
  - DigitalChina
  - ...

- Team
  - IOL@USA
  - ETSI@EU
  - TAHJ@Japan

- Company
  - Google
  - Intel
  - Microsoft
  - …

- Organization
  - IETF
  - IEEE
  - IPv6 Forum
  - WiMax Forum

- Team
  - IOL@USA
  - ETSI@EU
  - TAHJ@Japan

- Company
  - Google
  - Intel
  - Microsoft
  - …
IPv6 ubiquitous green community control network

IPv6 Green Community Network: providing environment monitoring and energy consumption management mechanisms to ease energy shortage and environment degradation leaving a secure, comfortable and convenient living environment.
Z-Park NGI (Next Generation Internet) Industry Alliance

- Z-Park NGI Industry Alliance
  a) endorsed by Z Park Government in Feb. 2005, initiated by 62 enterprises;
  b) cooperate with the top of China’s Universities
  c) build a new industry-academic-research setup and deploy it into next generation internet industry chain

- BII Group is the Founder & Chair of Z-Park NGI Industry Alliance
International Cooperation Activity

IPv6 Forum  Japan IPv6 Promotion Council  EU

SIPit  EU IPv6 Future  ITU IPv6 Workshop
Cooperate with International Organizations

• IPv6 Forum (Cooperating from 2000)
  – Membership and PR
  – Certification lab: “IPv6 Ready Logo”
  – Event: Global IPv6 Summit
• WiMAX Forum (Cooperation from 2005)
  – Membership Development and Building Eco-system
  – Government Relationship and Regulation Promotion
  – Analysis Report and Training
  – Event: Global WiMAX Summit
• WiMedia Alliance (Cooperation from 2005)
  – Membership Development and Building Eco-system
  – Regulation Promotion
  – Event: Global WiMedia Summit
• Bluetooth SIG (Cooperation from 2008)
  – Membership Development and Building Eco-system
  – Promotional Event, Summit and Tradeshows
  – National standards creation
Global IPv6 Summit in China

- Global IPv6 Summit in China
  - Around 600-800 attendees each year

- Role
  - A platform for IPv6 technology & business communication
  - Promote the relationship between international venders and inner venders
  - Training IPv6 human resource
Conclusion

• **Industrialization Upgrade**
  - Government re-organization will speed up the industrialization upgrade process
  - Leverage IPv6-enabled Next-Gen Internet to build intelligent infrastructures
  - Construct “Green Society”, promote Energy Conservation and Emission Reduction concept

• **New Internet Economy**
  - 2008 Olympics has dramatically accelerated the maturity of IPv6 application and service
  - China believes that IPv6 is the key to meet the demand of its fast-growing internet economy
  - As the world largest internet user country, China will become the one of the engines and flagships to new internet economy

• **China is resolutely to become an innovative center, we already have good foundations, look forward to more co-operations with USA and the world.**
Back up slides
Appendix: Liu Dong’s Profile

- Enterprise Position
  - 1995, Founder of China first internet institute, BII (Beijing Internet Institute), CEO and President
  - 1999, Founder of BII Group Holdings, CEO and President of BII Group

- Industry and Academic Positions
  - From 2001, Co-founder and Board, China Internet Society
  - Chair and director, Mobile Internet & Wireless City Committee
  - From 2001, Advisor, ICANN Government Advisory Community of MII (Ministry of Information Industry)
  - From 2003, Board & Fellow of IPv6 Forum, Chair of China IPv6 Council
  - From 2005, Chair and President, Beijing Ubiquitous Society
  - From 2005, Founder & Chair, Z-Park NGI (Next Generation Internet) industry Alliance
  - From 2005, Member of Expert Working Group, China Next Generation Internet Project (CNGI Project)
  - From 2005, Director of WiMAX Forum China Office
  - From 2006, Director of WiMedia Alliance China Region
  - From 2008, Chair of China Mobile Internet Forum
  - From 2008, Chair of Wireless City Forum
  - From 2001, Deputy General Director and fellow, BII-BUPT (Beijing University of Post Telecom) NGI R&D Lab

- Professional Awards and Honors
  - April 2004, “IPv6 Internet Pioneer”, granted by Dr. Vint Cerf on behalf of IPv6 Forum
  - 2005, “Top 100 Elite”, granted by SiNA.COM (China largest Portal)
  - March 2007, Lead BII Group win “Z-Park Innovative Enterprise Top 100”, granted by Beijing Municipal Government, China Science and Technology Ministry, China Academy of Science
  - December 2007, Lead BII Group win “First Grade Award” for IPv6-Based Video Surveillance R&D and Olympics Innovation Application Project. Granted by China Communications Society of MII
Z-Park NGI (Next Generation Internet) Industry Alliance (2)

Beijing

Set up at Feb. 28, 2005. Over 60 members, including: Lenovo, ChinaTelecom, ChinaUnioncom etc.

China 2009年

Set up National NGI Industry Alliance based on the experiences in Z-Park NGI industry Alliance

World 2010年

Cooperate with world wide in 2-3 years, good relationship with global organizations, absorb famous MNC join it
中关村科技园成立二十周年成就展，国务委员刘延东视察中关村下一代互联网产业联盟。

国务委员刘延东，北京市市长郭金龙听取汇报。
BII IPv6 Global Test Center

- 2003 BII Test Center released the first test result about interoperability and performance of primary High-end routers;
- 2004 BII Test Center host Plugtest collaborating with ESTI;
- 2005 BII Test Center setup IPv6 ShowNet on the IPv6 Summit;
- 2007 BII Test Center host SIPit’21 collaborating with SIP Forum in Beijing;
- Finish 60+ tests and applications.
- Our partner and customer:
City & Carrier Grade IPv6 Surveillance System

[Green Intelligence] Distribute, Synchronous, Security

Strategy & Control

Intelligence Control Platform

WCDMA/3G Messages Gateway

NGI

Sink

Sensor

Intelligence Surveillance Devices

Sensor Sink

WSN end devices

Cert DB SIP Server App DB Manger DB
Intelligent Building & Digital Home

IPv4/IPv6 network

v4/v6 transition; Cloud Computing; Mesh up;

Users

Digital Home

Personal Network Mesh Up

Intelligence Building